

### **ABSTRACT OF THE DISCLOSURE**

**A radio frequency communication system utilizing a radiating transmission line is disclosed. During normal operation, mobile communication units near the radiating transmission line can communicate with other mobile communication units near the transmission line as well as with a base station. The communication system comprises amplification units coupled to the radiating transmission line at periodic locations for amplifying communication signals traveling upstream and downstream on the transmission line. During normal operation, the communication signals are transmitted at a first and second frequency such that at least the second frequency can be radiated from the transmission line to be received by mobile communication units located near the transmission line. The amplification units also comprise degradation detection units which detect when the communication system has been degraded between any two amplification units. Upon detection of a degradation, the amplification units commence to amplify, transmit and receive the communication signals across the location of the detected degradation at a first fault frequency and a second fault frequency, rather than the first frequency and second frequency, respectively. The first fault frequency and the second fault frequency are selected and the power level of the signals is increased in order to facilitate radiation of the communication signals across the detected degradation in the communication system. The degradation detection units may detect the degradation in the communication system between two amplification units by detecting a decrease in the power level of the first and/or second communication signals, a decrease in the power level of a DC signal sent between the amplification units, and/or transmission of a communication signal at either the first fault frequency or second fault frequency. The detected degradation could result from damage to the transmission line and/or damage to one or more components attached to the transmission line such as a branching unit, a portable telephone and/or another amplification unit, which degrades communication of the communication along the communication system.**